

CLAIMS

1. A rubber kneading machine comprising:

two horizontal rolls disposed vertically close to each  
5 other through the intermediary of an adjusting device for  
allowing the gap between an upper roll and a lower roll to  
be freely adjusted, rotatively driving means for rotating  
the rolls, and a screw extruder for supplying a rubber  
lump fed into a hopper at a proximal end to the rolls,

10 wherein a circulating mechanism for kneading and mixing  
rubber that is formed by feeding a rubber sheet that has  
left the rolls to the hopper is constructed of a winding  
control means for selectively winding the rubber sheet  
onto the upper roll by differentiating the rotational  
speeds of the upper and lower rolls by a variable speed  
15 motor or a decelerator, and a carrying means for sending  
the rubber sheet coming off the upper roll to the hopper.

2. The rubber kneading machine according to Claim 1,  
wherein the carrying means is a conveyor.

20 3. The rubber kneading machine according to Claim 2,  
wherein a belt conveyor is hung over the upper roll so as  
to guide a sheet from the rubber rolls onto the belt  
conveyor to feed it to the hopper.

25 4. The rubber kneading machine according to Claim 1,  
wherein the carrying means has a scraper, which is in

contact with the upper roll at an upper level of the roll, peels a rubber sheet wound thereon, and then guides it to the hopper.

5. The rubber kneading machine according to Claim 1, wherein the carrying means is constructed of a scraper that is in contact with the upper roll at an upper portion thereof to peel off a rubber sheet wound thereon, and a conveyor for feeding the rubber sheet peeled by the scraper to the hopper.

10 6. The rubber kneading machine according to any one of Claims 1 to 5, wherein the screw extruder comprises two tapered screws that mesh each other and rotate, and an extrusion cylinder accommodating them, wherein the extrusion cylinder has an elliptical or gourd-shaped section and is tapered in its axial direction.

15 7. The rubber kneading machine according to any one of Claims 1 to 5, wherein a horizontal rubber fall preventing plate in contact with the lower roll is provided between the upper and lower rolls and the distal end of a collet 20 of the screw extruder, walls are vertically provided on both sides of the rubber fall preventing plate so that the interval therebetween can be set freely, the space formed between the walls is used as a rubber reservoir, a detector for detecting the amount of accumulated rubber is 25 provided at an upper level of the rubber reservoir, and

the numbers of revolutions of the screws are adjustable on the basis of the amount of accumulated rubber detected by the detector.

8. The rubber kneading machine according to any one of 5 Claims 1 to 5, wherein a horizontal rubber fall preventing plate in contact with the lower roll is provided between the upper and lower rolls and the distal end of a collet of the screw extruder, the space formed by vertically installing walls on both sides of the rubber fall preventing plate is used as a rubber compression passage, and a rotative plate for setting the sectional area of the rubber compression passage is provided at an upper level of the space such that it is in contact with the walls on both sides and its position is vertically adjustable so as 10 to form a rubber lump into a sheet to be supplied to the rolls by the rotative plate.

9. The rubber kneading machine according to Claim 8, wherein the rubber reservoir formed at the outlet side of the rotative plate is provided with a detector for 20 detecting the amount of rubber in the rubber reservoir, and the numbers of revolutions of the screws are made adjustable on the basis of the amount of rubber in the reservoir detected by the detector so as to permit banking of rubber in the space.

25 10. The rubber kneading machine according to Claim 9,

wherein the detector comprises a lifting plate rotatively retained above the rubber reservoir by a hinge, and a rotational angle of the lifting plate is detected by a sensor so as to detect the amount of rubber in the reservoir.

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11. The rubber kneading machine according to any one of Claims 1 to 5, wherein an extrusion cylinder accommodating the screws in the screw extruder is constructed such that it can be attached to and detached from a screw extruder main body including the screws and a driving mechanism thereof, and roll frames supporting the upper and lower rolls and the distal end of the extrusion cylinder are constructed to be removable, and

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15 a driving mechanism for driving the roll frames and the extrusion cylinder and the extrusion cylinder and the screw extruder main body toward or away from each other is provided.

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12. The rubber kneading machine according to Claim 11, wherein clamps for removably fastening the extrusion cylinder to the roll frames and the screw extruder main body are provided, and the driving mechanism is driven in a direction for moving the roll frames and the screw extruder main body toward or away from each other.

25 13. The rubber kneading machine according to Claim 11, wherein the screw extruder main body and a direct acting

machine constituting the driving mechanism are disposed on a base, the roll frames are fixed on a carriage connected to the direct acting machine, and the extrusion cylinder is supported on the carriage such that it can be moved in 5 a direction in which the frames are moved.

14. The rubber kneading machine according to any one of Claims 1 to 5, wherein, at the rubber outlet side of the upper roll, a retaining seat for a cutter that is pressed into contact with the roll and slidable with respect to 10 the roll surface so as to cut rubber in a direction parallel to a roll axis.